5/20/13

STATE OF SOUTH CAROLINA
CERTIFICATE OF TITLE
OF A VEHICLE

VEHICLE ID NUMBER	YEAR	MAKE	BODY STYLE	MODEL
F11YRU86504	74	FORD	P&P	F11YR

WEIGHT	NEW/USED	TITLE NUMBER	ODOMETER	DATE ISSUED
999	USED	25559146	24,107 *	01-06-1995

FULL NAME OF OWNER(S)
GEONEE COUNTY OF
208 BOOKER DR
WALHALLA SC 29691

VEHICLE BRAND(S)
*WARNING-NOT ACTUAL MILEAGE

THE SOUTH CAROLINA DEPARTMENT OF REVENUE AND TAXATION HEREBY CERTIFIES THAT THE PERSON HEREIN IS REGISTERED BY THIS DEPARTMENT AS THE LAWFUL OWNER OF THE VEHICLE DESCRIBED SUBJECT TO THE LIENS, IF ANY, HEREIN SET FORTH.

M. W. DUFFORD
DIRECTOR, DMV

A. C. CLARKSON, JR.
CHAIRMAN

KEEP IN SAFE PLACE - ANY ALTERATION OR ERASURE VOIDS THIS TITLE

2469284

To: Oconee County Fire Commission 5/03/03
From: Cleveland Rural Fire Chief

Dear Fire Commission

Please Allow this Letter to serve as notification that We are requesting the return of the title for our 1974 Ford brush truck, this vehicle is being sold and will no longer be covered under county insurance. The Cleveland Fire Dept. also asks that permission be granted, when replacement truck is acquired, for insurance to be furnished by Oconee County as is now.

Thank you in advance for your help in these matters.

Sincerely Yours
Chief TRAVIS V. COLLINS

Rec 5/8/03

BLW

Trehel

May 16, 2003

RECEIVED
MAY 16 2003

Ms. Melissa Grant
Oconee County Solid Waste Director
PO Box 1766
Seneca, SC 29679

Re: Transfer Station Push Walls, Revised Quote

Dear Melissa:

Based on our site meeting from March 25 and our recent phone calls, we have met with appropriate parties to develop pricing for the replacement of the steel "skin" and overflow prevention of the push walls. There appears to be no structural damage to the concrete walls, other than the top corner that has cracked in a few locations, either from pulling or stress on steel plates. Therefore, this does not appear to be a construction or design issue. The installation design provided in the report is very similar to the actual installation with exception of the weld bolt length. Existing steel was ¼" thick with no account given in the report for wear (reported at 3/16"). Existing weld bolts were ½" diameter and embedded approximately four inches, where the recommendation is a three bolt design.

The current design suggestion includes attaching the overflow plate and structure to the building structure. In our opinion, the current building structure has not been designed to carry the additional collateral load introduced in this scenario. We suggest, with engineers' input, to use a stand-alone system, freestanding with tube steel columns and supporting the ¼" overflow plate. The current design also specified 10' x 8' plates for the push walls. We have changed them to 20' (wide) x 8', to reduce the number of joints in the wall, which seem to be one of the problems due to the loader bucket snagging the splices. From an operation standpoint, we would suggest the County investigate "padding" the sides of the loader bucket, similarly to the bottom. The prices following include these assumptions.

If Trehel Corporation were hired to complete this work, a lump sum quote would be provided for the following amount (not including engineering):

Forty Five Thousand Seventy One Dollars ----------$45,071.00

Please see the attached estimate for the actual costs and distribution of dollars within the scope of work. As before, we will gladly provide options from the supplier to use thicker plates, if desired.

Although this was a public bid contract, due to our relationship with the County and the risk we incur by making design and function suggestions, we will bear some of the cost related to completing this work, by removing our overhead, fee, supervision, management, small tools, and other general conditions. The following price is identical in scope but includes the reductions mentioned earlier. We will complete this work one side at a time, as requested, in order to continue operation. We are also willing to complete this work on a "cost" basis. In other words, we will credit Oconee County 100% of any savings generated from efficiencies during the process. Based on our estimate, please note the following sum for the repair and upgrade to the push walls:

Thirty Six Thousand One Hundred Sixteen Dollars ----------$36,116.00
For engineering, add $1,250.00 (One Thousand Two Hundred Fifty Dollars)

I urge you to please consider using the engineering quote listed. The company that has priced this understands the project well and they bring a balanced approach to design and construction.

For the construction schedule, the approximate duration will be about three weeks, or a little over a week per side. We will need approximately two weeks to procure and receive the steel, after engineering.

Thank you for this opportunity, and please call with any questions or needs.

Respectfully,
TREHEL CORPORATION

Will W. Huss, Jr.
Vice President of Operations

Cc: Marianne Dillard, Neal Workman, Alan Pope
Enclosures: Estimate, sketch, supplier quote

Trehel Corporation - Design/Build Contractors — ESTIMATE AND PRICING

PROJ: Oconee County Transfer Station
INFO: Based partially on design by Sam Hill
work to be performed one side at a time
Panels to be set in 20' lengths to reduce joints
Permitting by owner

WORK ITEM: Repair & Upgrade Push Walls
SPEC NO: Design Package

SHEET NO: 1 of 1
DATE: May 15, 2013

				MATERIAL		LABOR			SUBCONTRACT		EQUIPMENT	
CODE	WORK DESCRIPTION	QUANTITY	UNIT	U.P.	COST	M.H.	RATE	COST	U.P.	COST	COST	TOTAL
02000	Demolition / remove overlay				0			0		0		0
	remove existing plan plates	1	s	50	50	15	23.46	422		0	100	572
	remove existing angle shields	1	s	25	85	10	23.46	235		0		320
	remove / haul angle iron	1	ls	179	179	8	23.46	188		0		367
	Haul & remove	5	ton	0	0	4	25.65	103		0		103
	Open walls & weld plates	1	ls	25	25	6	23.46	141		0		166
	Clean & grind top walls	148	lf	0.69	101	6	23.46	158		0		259
	drill new holes for hairpin bolts	444	ea	3	0	95	23.46	1478		0	750	2228
	rpl existing bolts	1	ls		0			0		0	500	500
					0			0		0		0
					0			0		0		366
03300	Repair / patch concrete walls	2	ea	197.85	369			0		0		369
	install patch				0	16	23.46	375		0		375
	Anchors for new top plate	72	ea	0	0	20	23.46	469		0	220	689
	epoxy for patch	296	lf	3.85	183	3	23.46	135		0	55	373
					0			0		0		0
05000	20' x xxx" steel plates	1	s	7381	7381	160	23.46	3754		0		11135
	crane & welder	1	ls		0			0	1000	1000	850	1850
	20"x4'x1/4" overflow plates	1	ls	3499	3499			0		0		3499
	Top plate with support	1	ls	10740	10740			0		0		10740
	pafp - install / torque	444	ea		0	6	23.46	162		0		162
	grind patch & anchor connections	444	ea	0.5	222	8	23.46	199		0		410
	torch cut angles / grind & prime	2	ea	50	100	6	23.46	169		0		269
					0			0		0		0
01000	Supervisor	2	wks		0	50	34.5	2760		0		2760
	management	1	wks		0	8	35	620		0		620
	small tools	1	s		0			0		0	500	500
	testing (welds & bolts)	1	s		0			0	400	400		400
	vehicles & phones	2	wks		0			0		0	175	175
	PPE/Safety	1	s		0			0		0	150	150
	Design / Engineering	1	s		0			0	1550	550		1550
	Corporate Overhead & Fee	1	ls		0			0	5000	5000		5000
					0			0		0		0
												35176
	SUBTOTALS				22870			11302		7450	3270	1144
ADJUSTMENTS	tax		0.05		1144							46321
	TOTALS				24014			11302		7450	3270	$ 46,321

Seneca Landfill Closure – Phase II

Prepared for:
Oconee County Solid Waste
PO Box 1766
Seneca, SC 29679

Prepared by:
Goldie & Associates
210 W. North Second Street
Seneca, SC 29678

May 2003

G&A Project No. 22.40.1

Purpose

The purpose of this report is to investigate the feasibility of capping the Division II portion of the Seneca Landfill. This study will investigate cap materials, soils available to close the landfill, project costs, and proposed schedules for the project. The project is referenced as Phase II. The area to be capped is Division II.

Background

The municipal solid waste (MSW) portions of Seneca Landfill have been officially closed since 1998, meaning that no municipal waste are accepted and disposed of. Although the entire MSW is officially closed, only the sections originally permitted by SC DHEC (Division I) were closed out under current Subtitle D regulations, including the installation of a cap. A cap is a highly impenetrable layer, typically comprised of specific clays or synthetic materials, whose purpose is to prevent the infiltration of surface water (rain) down through the waste cells into the underlying ground water. This prevents, or at least greatly slows, the movement of potential contaminants out of the waste. The other portion of the landfill (Division II) was utilized prior to institution of current regulations and was never permitted during its use, causing confusion over its status for closure under current regulations. As a result, SC DHEC did not require the Division II portion of the landfill to be capped, and the County chose not to place a cap onto it, although this portion was in all other ways closed according to regulations (grading, installation of sediment ponds, seeding, etc.). Figure 1 outlines the capped (Division I) and uncapped (Division II) portions of the landfill. Division II consists of approximately 25.92 acres.

In the mid 1990s DHEC required the County to perform a groundwater assessment to characterize the extent of the landfill's impact on the ground and surface waters at the site. This assessment was a multi-phase process that included "hydropunching" the site to get a snapshot of the extent of groundwater contamination and the use of this hydropunch data in the determination of the placement of a new set of permanent monitoring wells. In addition, the County elected to conduct an assessment of potential impacts to any public well systems within a 1-mile radius of the landfill. The assessments were completed, with a final report, in May 1998. Basic conclusions of this Ground Water Assessment Report included:

1. Impact to groundwater was detected but the extent was limited to within 300 feet of the landfill (the private property was subsequently purchased by the County);
2. VOC impact on the groundwater appears to be decreasing;
3. Surface water impacts from VOCs was not evident.

Since 1998 the monitoring wells have been monitored semi-annually for VOC and metals impacts. Besides this routine monitoring of wells, surface water and storm water have

been periodically sampled as well, but little or no environmental impact from VOCs has been noted.

A second groundwater plume assessment, conducted in the spring of 2002, verified that contaminant plumes are being maintained onsite; however, DHEC is requiring that the groundwater contamination that exist onsite be remediated. State regulations require any remediation to address the source of the contamination. Since contamination is relatively minor at Seneca Landfill, and no point sources of contamination are known, "source" remediation implies a "whole site" remediation strategy.

Golder & Associates performed a study to determine the most likely source of groundwater contamination (VOC migration due to movement by methane gas or by landfill leachate). The study revealed that the VOC contamination was not being transported by the methane gas, but was more likely a result of direct infiltration of landfill leachate into the groundwater. These results support the installation of a cap over Division II, rather than other remediation options, such as expansion of the landfill's methane extraction system.

The next step will be to install a Subtitle D cap on the Division II portion of the Landfill (Capping Phase II). This will effectively stop or significantly slow surface water seepage through the garbage and into the groundwater. Figure 1 represents the area proposed for capping.

Cap Material Evalution

Compacted Clay Liner (CCL)

The classic capping method is the installation of a compacted clay layer over the garbage containing portions of a landfill. This clay layer is required to meet specific permeability (1×10^{-7} cm/s) and thickness (18") requirements. In the southeast, clays are generally found and transported from nearby borrow sites.

Various alternatives to a Compacted Clay Liner can be used in closing the Seneca Landfill. These include materials made from Polyethylene, Polyvinyl Chloride, Polypropylene, Bentonite admixtures, and Geosynthetic Clays. Technical properties such as percent elongation, flexibility, permeability, tear resistance, and puncture resistance can vary. Construction factors such as feasibility, method of seaking seams, time requirements, and necessary extras are issues to consider as well.

Polyethylene Liners

Polyethylene Liners (PE) are used extensively in landfills today. They are considered the best material as far as performance is concerned because they have the lowest permeability. The actual cost of the material is relatively low, but when the necessary slope stabilization and drainage nets are added, the cost increases significantly. Slopes need a drainage net to allow the water to flow off the cap without causing the overlying soil erosion layer to fail. Special textured liners or composite grids may be needed to stabilize the slopes and prevent the soil from sliding off the liner. PE liners require a gas filter system to prevent gases from pushing the liner up through the soil. These added costs make these liners a relatively expensive option. Construction problems include:

- Difficult installation in cold & windy weather
- Swelling on hot days
- Requires skilled labor to ensure that seams are sealed correctly

PE liners fall into two categories, High Density PE (HDPE) and Low Density PE (LDPE).

High Density Polyethylene (HDPE)

HDPE is most commonly used for a liner on the bottom of a landfill because it is more chemically resistant to leachate, more impermeable, and has a higher puncture resistance. Of the materials evaluated, HDPE is the least permeable.

Linear Low Density Polyethylene (LDPE)

LDPE is typically used as a capping material. LDPE has many of the same characteristics as HDPE, but it is more flexible. This is very important for a cover system because differential settlement of the waste may cause the material to stretch. LDPE has a higher percent elongation than HDPE.

Polyvinyl Chloride Liners (PVC)
PVC liners have up to 17% plasticizer compounds in them to make them flexible. These plasticizer compounds are volatile and can leach out over time. PVC is very flexible, but it can become brittle and fail as the landfill settles. The seams are glued, and they can also become brittle and fail. In addition, too much glue can break down the membrane. There have been instances where municipalities were required to recap their landfills because of these problems. It should be noted, however, that if proper installation practices are followed, many of these problems can be avoided.

Polypropylene Liners (PP)
PP is a fabric reinforced material that is strong and very flexible. The fabric reinforcement reduces susceptibility of the material to cracking and also reduces swelling and contraction. The cost of the material, however, is much higher than most other synthetic materials. It is generally not used as a landfill cover because of the high costs.

Geosynthetic Clay Liner (GCL)
A GCL is a three-layer mat that has Bentonite clay sandwiched between two geotextiles. The clay hydrates when it is exposed to water and forms an impermeable layer. One of the benefits of this liner system is that it does not require seams. The mat is simply overlapped with loose bentonite clay. GCLs are not as puncture resistant as other liners, but if a puncture does occur, the Bentonite Clay will seal around the object. This phenomenon is known as self-healing.

Bentonite Admixtures
Bentonite is a highly impermeable clay that occurs naturally in only a few places in the world. Many times the clay naturally existing at the landfill site does not meet the permeability requirements. One solution is to ship bentonite to the site and mix it with the native soil. This mixture, if done properly, can lower the permeability of the native soil to acceptable levels. Mixing, however, can be a very laborious and time-consuming task. For bentonite to be used at the Seneca Landfill, it would have to be shipped from Wyoming. A large mixing area would be constructed where the two soils would be tilled and mixed together. The soil would then be placed and compacted on the landfill. The transportation and construction costs quickly make this alternative very unattractive for use over an entire landfill.

Other Factors
There are a variety of factors that need to be addressed when selecting a liner system. Ease of construction can be an important factor. The GCL is by far the fastest and easiest to construct. The PE liners need to have their seams sealed and tested. The CCL needs to have the proper moisture content and compaction, as well as extensive testing procedures to ensure that the compacted soil will meet the minimum permeability requirements.

The largest factor / variable is how long the liner will last. Clay liners have been used successfully for many years, and because they consist of natural materials, they won't deteriorate or chemically break down. The longevity of the synthetic or manmade

materials is not currently known. Accelerated ageing tests are currently being conducted on PE liners, and they indicate that the liners will last up to 50 years with no significant signs of deterioration.

Summary

Each of the different liner systems has it own set of advantages and disadvantages. Table 1 provides a detailed comparison of technical properties and construction factors. Table 2 shows an average cost comparison for the different liner systems. From an engineering standpoint, the best system is a double or triple liner system that employs a combination of the above liners (often the strength of one is the weakness of another). These systems are very expensive, however, and may not be economically feasible in this situation. To determine which liner system is the best for the Seneca landfill will depend on the priorities of the County. Factors such as ease of construction, price, permeability, and proven performance are all factors to consider. Most landfills of this age and size typically have a clay cap. Division I portion of the Seneca Landfill, and the Five Forks Landfill have this type of cap. The next section of this report further examines possible borrow sites and cost estimates associated with a clay cap.

Site Selection / Soils Investigation

Landfill Borrow Site (New C&D landfill site)

This study focused on two sites for clay material. The first site is referred to as the landfill borrow site. This site is the location of a clay borrow site for the Phase I closure and it is also the proposed site for a future Construction and Demolition (C&D) landfill. This site is desirable for the main reason that the site will be cleared, grubbed, and excavated to build the initial C&D cell. The site is currently a combination of grassland and forest. Figure 2 delineates this site and indicates the results of soil permeability tests conducted. Appendix A contains a table further illustrating the soils' test data. A preliminary estimate of 38,800 cubic yards of soil is expected to be available from this site.

Strawberry Farm Road Site

The second site is referred to as the Strawberry Farm Road Site. This site was also a clay borrow site for the Phase I closure (referred to in 1998 as the hospital borrow site). The area investigated is on the south side of the creek that splits the property. This site is desirable because it is owned by the County and is contiguous to the landfill. The area of investigation is currently forested. Figure 3 delineates this site and indicates the results of soil permeability tests already conducted. Appendix A contains a table further illustrating the soils' test data. A preliminary estimate of 41,600 cubic yards of soil is expected to be available from this site.

Results & Recommendations

An estimated 78,400 cy of clay material is anticipated to be needed for a clay cap (this figure is inflated 25% to take into account shrinkage and spoil). The Landfill borrow site is estimated to provide approximately 38,800 cy. The remainder of the clay material will need to come from either the Strawberry Farm Road Site or by mixing bentonite into interior soils from the Landfill borrow site. Under typical situations, using a bentonite admixture to the soil is not as cost effective as opening another borrow site. However, since the new C&D landfill is going to be opened up in this area, it will be necessary to remove this soil from the borrow site area. When taking the cost for this line item out of the equation and factoring the cost of opening another borrow site (design, permitting, clearing & grubbing, grassing, sediment & erosion control), it may be more cost effective to consider a bentonite admixture. It is therefore our recommendation to perform a pilot study to determine the feasibility and cost associated with mixing bentonite with the soils from this area to make suitable clay material to make up the difference from the available suitable material at the landfill borrow site.

Table 3 provides a construction cost estimate for a clay cap utilizing soils from both of these borrow sites. It was assumed that the Strawberry Farm Road site was utilized to make up for the projected shortfall of necessary clay material. Please be aware that further soils analysis is currently ongoing and the results may indicate that there is enough clay material at the landfill borrow site so that opening the Strawberry Farm Road site will not be necessary.

Please be aware that the costs associated with this project also include components for two other projects. We are proposing that at the end of the Phase II closure project, the County will have an excavated pit to being landfill operations for the new C&D landfill, as well as having a staging area on the Division II portion of the landfill for mulching, composting and C&D recycling. The costs associated with the grading and grassing portions are included with this cost estimate. Other costs associated with these additional projects that have *not* been included include gravel and concrete staging areas.

Table 1
Impermeable Layer Comparison
Seneca Landfill Closure (Phase II)

	Polyvinyl Chloride	High Density Polyethylene	Low Density Polyethylene	Polypropylene	Geosynthetic Clay Liner	Bentonite Admixtures	Compacted Clay Liner
TECHNICAL PROPERTIES							
Elongation %	20	13	18	N/A	N/A	N/A	N/A
Flexibility	good	fair	good	good	good	self-healing	self-healing
Permeability (cm/sec)	9.5x10-10	5.6x10-13	1x10-12	N/A	1x10-9	1x10-5	1x10-5
Tear resistance	good	good	good	good	good	N/A	N/A
Puncture resistance (lbs)	N/A	60	50	N/A	self-healing	self-healing	self-healing
CONSTRUCTION FACTORS							
Feasibility	special crew, large sheets / fewer seams glued, not consistant	special crew, chemical resistant hot shoe / extrusion weld	special crew, commonly used hot shoe / extrusion weld	special crew hot shoe / extrusion weld	simple installation overlain 6", no seams	good Q.C. requires, can be sticky or cloudy	good Q.C. required, proper moisture content critical
Seams		medium (weld seams)	medium (weld seams)	medium (weld seams)	very fast (overlap)	N/A	N/A
Time Required	fast (glue)	drainage nets, gas collection nets	drainage nets, gas collection nets	drainage nets, gas collection nets	drainage nets, gas collection nets	slow (mix soil)	medium/slow
Extras						proper soil mixing	none
Problems / Delays	wind & swelling / seam failure / slope procedures	wind swelling / slope procedures	wind swelling / slope procedures	wind swelling / slope procedures	rain	rain	rain

Table 2
Average Installed Cost Estimates for Liners
Seneca Landfill Closure (Phase II)

	Polyvinyl Chloride	High Density Polyethylene	Low Density Polyethylene	Polypropylene	Geosynthetic Clay Liner	Bentonite Admixtures	Compacted Clay Liner
Cost / Ft2 (installed)*	$ 0.55	$ 0.55	$ 0.55	$ 1.02	$ 0.72	$ 1.13	Varies **
Cost / Acre +	$ 23,958	$ 23,958	$ 23,958	$ 44,431	$ 31,363	$ 49,223	
Cost / 25.92 Acres	$ 620,994	$ 620,994	$ 620,994	$ 1,151,660	$ 812,937	$ 1,275,869	$ 376,400

* Includes drainage nets; does not include gas filter or slope stabilization

** Assumes Clay is available within 1/4 mile of site @ $6/cy to haul, place, compact

+ Price includes impermeable layer only; does not include site prep, compaction, erosion layer, seeding, etc.

Construction Closure Cost Estimate
Seneca Landfill Closure Plan- Phase II
Goldie & Associates Project # 22.40.1
Table 3

No.	Item Description	Unit	Quantity	Unit Price	Total Price
1.	Mobilization/Construction Office	LS	1	$50,000	$50,000
	Landfill Site				
2.	Construction Entrance	LS	1	$1,000.00	$1,000
3.	Remove/Replace Fencing	LF	1,600	$5.00	$12,000
4.	New fencing, gates, signs	LF	2,300	$12.00	$27,600
5.	Extend gas venting wells	EA	15	$250	$3,750
6.	Topsoil - Removal/stockpile	CY	21,000	$2.00	$42,000
7.	Clay cap layer placement and compaction	CY	61,000	$3.00	$183,000
8.	Erosion layer, placement and compaction	CY	332,000	$2.00	$664,000
9.	Grassing	AC	26	$1,500	$39,000
10.	Grass lined ditches and swales	LF	5,000	$5.00	$25,000
11.	Gravel access road	SY	5,053	$3.00	$15,159
12.	18" CPP	LF	400	$20.00	$8,000
13.	Silt Fences	LF	3,500	$5.00	$17,500
14.	Well head protection	EA	4	$2,000	$8,000
15.	Misc. Rip Rap	SY	500	$25.00	$12,500
				Subtotal:	$1,105,509

Borrow Pit site (Landfill)

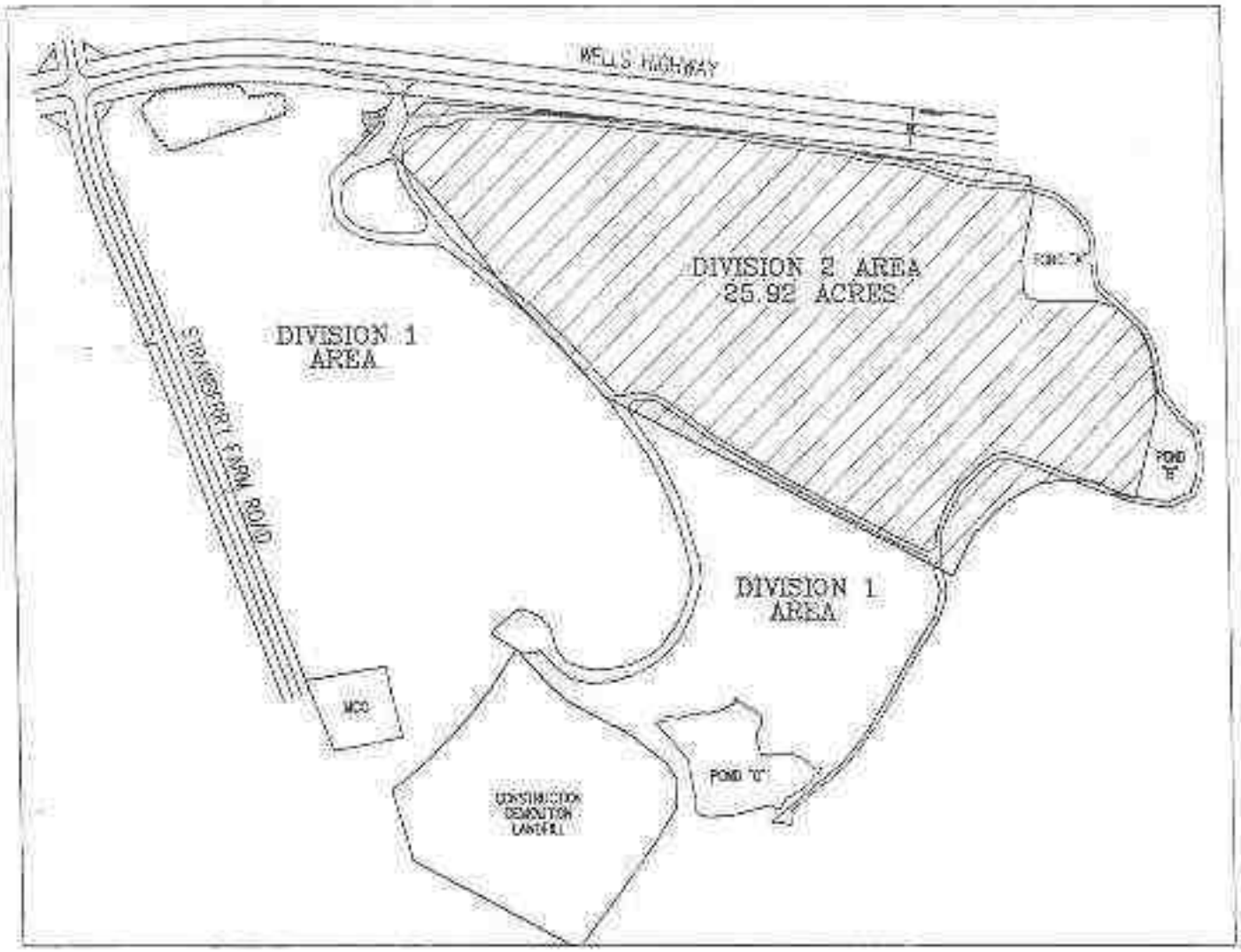
No.	Item Description	Unit	Quantity	Unit Price	Total Price
16.	Silt Fences	LF	2200	$5.00	$11,000
17.	New Pond Construction	LS	1	$10,000.00	$10,000
18.	Existing Pond Modification	LS	1	$5,000.00	$5,000
19.	Clearing & Grubbing	AC	5.6	$2,500.00	$14,000
20.	Strip / Stockpile topsoil	CY	8800	$1.00	$8,800
21.	Excavate and Haul Clay Material	CY	368000	$1.00	$36,800
22.	Replace topsoil/final grading	CY	8800	$1.00	$8,800
23.	Grassing	AC	10.9	$1,500	$16,350
				Subtotal:	$110,750

Construction Closure Cost Estimate
Seneca Landfill Closure Plan- Phase II
Goldie & Associates Project #:22.40.1

No.	Item Description	Unit	Quantity	Unit Price	Total Price
	Borrow Pit site (Strawberry Farm Road):				
23.	6ft Fence	LF	1000	$5.00	$5,000
24.	Pond construction	LS	1	$10,000.00	$10,000
25.	Construction Entrance	LS	1	$1,000.00	$1,000
26.	Clearing & Grubbing	AC	5.8	$2,500.00	$14,500
27.	Strip / Stockpile topsoil	CY	4700	$1.00	$4,700
28.	Excavate and Haul Clay Material	CY	41600	$3.00	$124,800
29.	Replace topsoil/fine grading	CY	4700	$1.00	$4,700
30.	Grassing	AC	5.8	$1,500	$8,700
				Subtotal:	$173,492
				Construction Total:	$1,392,652
				Engineering & Construction Management (10%):	$139,265
				Contingency (10%):	$139,265
				Total Estimated Costs:	$1,671,180

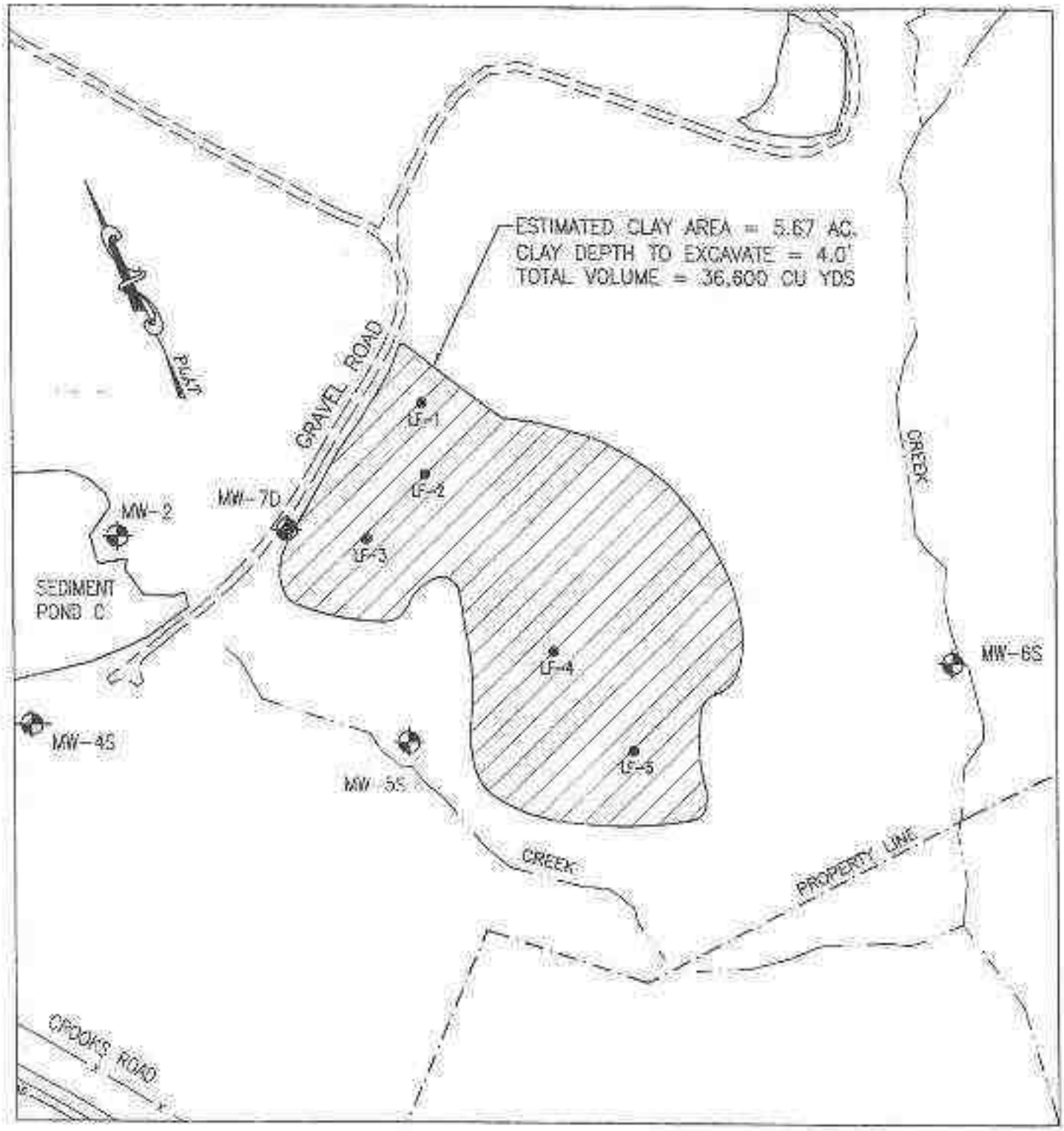
Note: A. Quantities are conceptual only. No plans have been designed or prepared.

Figures



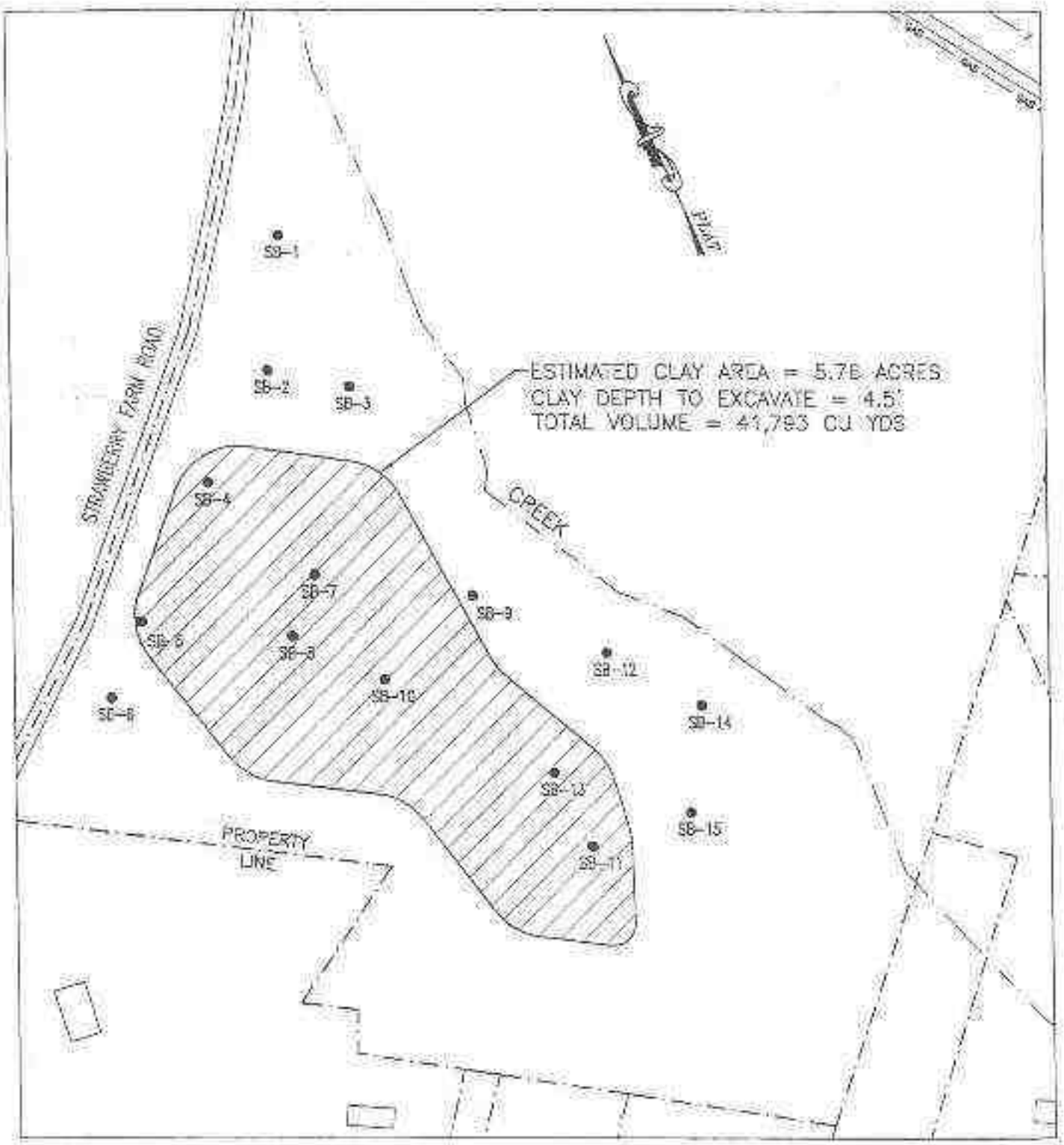
SCALE
1" = 400'

FIGURE 1
DIVISION BOUNDARIES
SENECA LANDFILL



SAMPLE NO.	HYDRAULIC CONTENT (cm/sec)	PASS-FAIL
LF-1	7.6×10^{-6}	PASS
LF-2	4.9×10^{-7}	PASS
LF-3	7.0×10^{-6}	PASS
LF-4	1.0×10^{-5}	PASS
LF-5	2.7×10^{-6}	PASS

FIGURE 2
SENECA LANDFILL BORROW SITE
SCALE: 1" = 200'



SAMPLE NO.	HYDRAULIC CONTENT (cm/sec)	PASS-FAIL
SB-5	4.0×10^{-6}	PASS
SB-6	1.3×10^{-5}	FAIL
SB-7	1.9×10^{-6}	PASS
SB-10	3.4×10^{-7}	PASS
SB-13	9.0×10^{-7}	PASS

FIGURE 3
STRAWBERRY FARM ROAD BORROW SITE
SCALE: 1" = 200'

Methane Well Remediation Plan
Seneca Landfill Flare and Extraction System

Prepared for:
Oconee County Solid Waste
PO Box 1766
Seneca, SC 29679

Prepared by:
Goldie & Associates
210 W. North Second Street
Seneca, SC 29678

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G&A Project No. 22.19.13

Introduction

Seneca Landfill was historically a solid waste municipal landfill serving Oconee County (Figure 1). The landfill first began accepting waste in the 1940s; however, it was not taken over by Oconee County until 1973. The Municipal Solid Waste section was closed in 1998; a Construction and Demolition (C&D) segment remains operational. Due to its age, the landfill was never required to meet many current regulations that were developed after the landfill opened, such as the requirement for lining.

In response to these developing landfill regulations, the County began working with the South Carolina Department of Health and Environmental Control (SC DHEC) in the early 1980's to assess the landfill's potential for impacting groundwaters, surface waters, and properties in the areas within and around the landfill. Methane monitoring results carried out during groundwater studies and routine probe monitoring during 1995 and 1996 indicated methane migrating beyond the landfill's boundaries. As a result of these detections, and per DHEC regulations, a series of permanent methane monitoring wells was installed along Wells Highway and Strawberry Farm Road in late 1997 (Figure 2).

As part of the MSW portion closure in 1998, a highly impermeable clay cap was installed over portions of the landfill. Caps often have the unfortunate side effect of trapping landfill gasses and forcing them to move laterally, where they eventually escape at the cap (landfill) boundary. During the closure, a series of passive vents was installed through the landfill cap. Such vents serve two purposes: (1) they allow methane to escape before reaching the landfill boundary and (2) prevent gas build up under the cap that can potentially build up pressures great enough to crack said cap.

Quarterly monitoring has been conducted on the permanent wells since their installation. Methane has consistently been detected above regulatory levels during this time. In 1998, a network of passive vents was installed at approximate 100' spacing along Wells Highway and Strawberry Farm Road. In the spring of 2002, these passive wells were converted to an active extraction system where landfill gas is actively pulled from the wells by vacuum and fed to an onsite flare system, capable of handling 250 ft^3/min (approximately 8×10^6 BTU/Hr) (Figure 3). Unfortunately, the system has been difficult to calibrate, primarily due to extremely low methane production / migration resulting from the severe drought experienced throughout 2002.

Current Status

Water in Extraction Wells

During the Spring of 2003, the severe drought ended and methane production / migration has increased. Although the extraction and flare systems are operational, methane is still being detected at the landfill boundaries. During a recent calibration of the extraction wells to compensate for the increased production, several wells that should theoretically be high producers were found to produce little or no methane. Further investigation has led to the discovery of significant amounts of water in several wells, especially along Strawberry Farm Road, across from the Oscar Raines property. It is theorized that the water contained in these wells is preventing methane from moving into and through the extraction system.

Sources of Water

The water within the extraction wells has been tested for reasons discussed below. One aspect of the testing was to establish the source of the water. Water column depths and elevations were found (Figures 4-7). In general, the well bottoms were found to be a minimum of 30'-40' above the normal groundwater table, thus it is believed that the water in the extraction wells is "perched" on top of a garbage layer. Please note that the graphs assume that the water bottom is at the well bottom, but most likely the well bottoms are higher than the actual level that water is perched on (i.e. water extends to some unknown depth below the wells).

The source of the water is still undetermined, as subsequent tests have shown that water levels appear to be influenced by rainfall (Figure 7). This leads to two possible sources; either direct infiltration through the cap, or subsurface lateral movement from higher elevations (across Strawberry Farm Road) under the cap. The latter is most likely due to the highly saturated soils caused by the excessive rainfall during the spring (Figure 8). There is no evidence of cap failure.

Analysis Results

As previously mentioned, the water contained within the extraction wells has been tested for content, both to determine any hazardous components and for submittal to sewer systems for their review / acceptance (discussed below). Results are contained in Appendix A. The water was not determined to be hazardous and most parameters appear to be within typical pretreatment sewer limits.

Strategies

The most obvious remediation is to remove the water from the extraction wells, opening up the wells so that methane may be actively extracted, preventing its migration beyond the extraction well perimeter. The two remediation actions being considered are as follows.

Option 1: Temporary Pumping

Temporary pumping consist of utilizing a mobile pump system to pump water from each well into a trailered storage tank, where it will then be transferred to a pump truck for hauling to a wastewater facility.

Advantages

1. Lower initial cost, assuming that the volume of water is not so great as to prevent this from being viable.
2. May be all that is necessary, assuming little recharge from rain and realistic volumes.
3. Even if not viable for complete removal, gives an indication on recharge rate (if any), how wells influence one another, and total water volume, that might be used in designing a permanent system.
4. One time "discharge" more acceptable to sewer systems.
5. Able to begin immediately.

Disadvantages

1. May be too much to pump (don't know horizontal plume size).
2. Water may recharge after pumping

Option 2: Permanent pump

Option 2 is to install a series of permanent pumps, forming a water extraction system. For this system, instead of periodic hauling, a permanent connection to the County sewer system would be most efficient. An automatic or manual system could be installed. This system would require much greater technology, including manifold systems, control systems, water piping, as well as obtaining a discharge permit from the Oconee County Sewer Commission.

Advantages

1. Continuous removal of water

Disadvantages

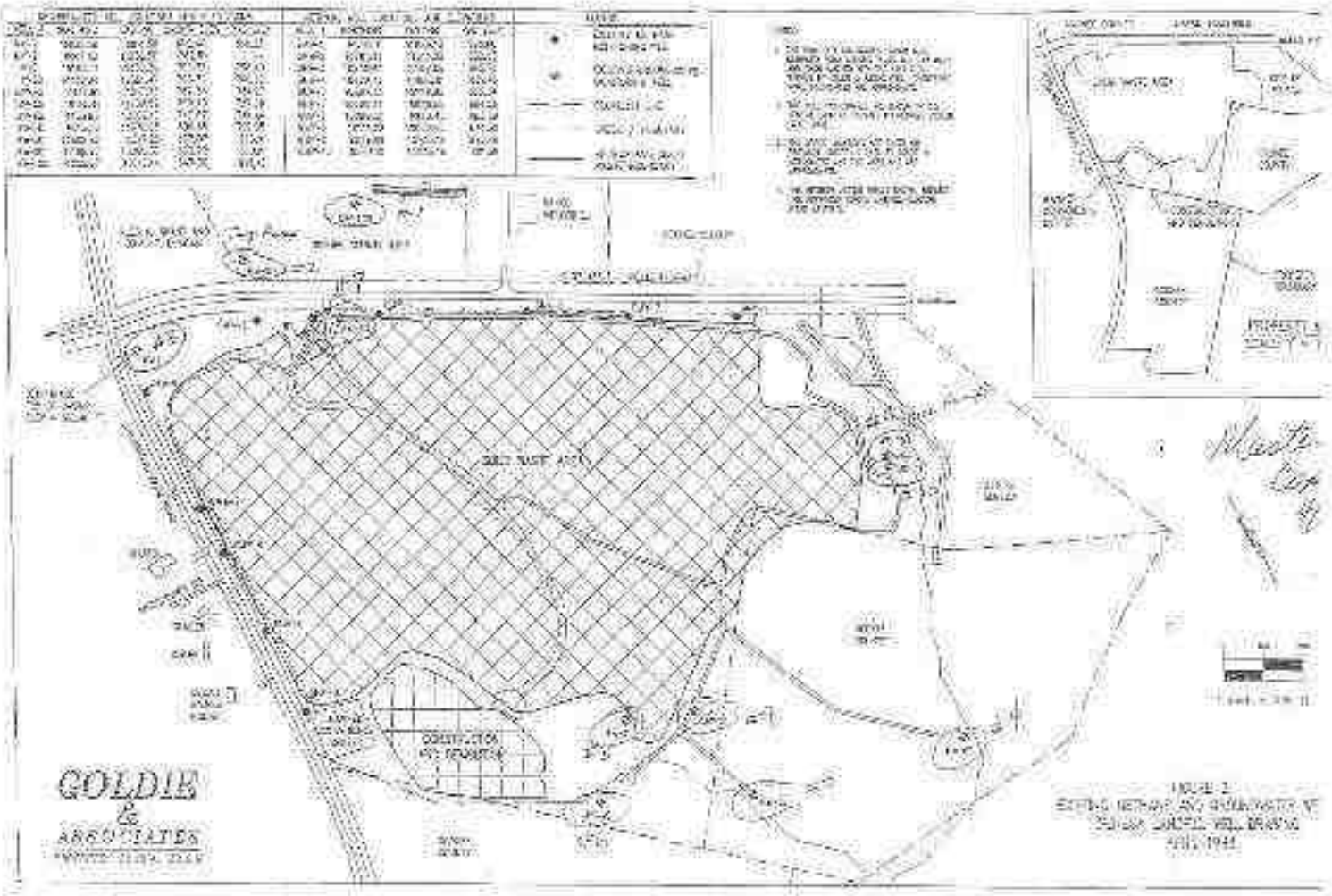
1. Initial capital cost is higher.
2. Need to obtain long-term acceptance from the County Sewer Commission, which might prove difficult.
3. Operation and maintenance costs could be costly.
4. Current wells may not be at the bottom of the perched water table.

Recommendation

Option 1 is the recommended strategy. This option allows for a determination of the extent (laterally and horizontally) and recharge rate (if any) of the perched water, even if complete removal is not possible. Removal, even if only temporarily, allows for a measure of the water's presence's actual impact on methane production / migration. It must be reiterated that this option may not provide a permanent fix, and that other options, whether option 2 above or others, may be required.

Timeframe

Temporary pumping can begin within weeks, a permanent system will take more time to permit and install, especially if negotiations with the Sewer Commission are extended. Goldie & Associates anticipates that either way, within eight (8) months of project implementation, verifiable results will be obtained. This allows for installation of a water removal system, seasonal fluctuations (in the event another drought hits during the summer, lowering methane migration), and calibration of the extraction system.


GOLDIE
&
ASSOCIATES

FEDDER, NORTON, BALLENGER, & ENDERLIN, P.A.
ATTORNEYS AT LAW
30 Short Street
PO Box 490
Walhalla, SC 29691

Telephone (864) 638-2930
Fax (864) 638-2922

Bradley A. Norton
Karen F. Ballenger
Derek J. Enderlin
Julie E. Mahon

W. J. Fedder
(Of Counsel)
Memminger E. Wiggins
(Of Counsel)

May 20, 2003

TO: All Persons Employed by Oconee County

FROM: Bradley A. Norton
Oconee County Attorney

Dear Oconee County Employees:

As you probably know, Supervisor Ann Hughes has recently been charged with several criminal offenses. Understandably, the criminal investigation and subsequent charges have created some confusion and unrest among some Oconee County employees. In short, many employees are wondering who they can talk to, what they can say, and what will happen to their jobs if they do talk. The purpose of this letter is to ease some of the unrest you may be feeling.

I have talked with Druanne White, the Tenth Circuit Solicitor (who has no involvement in this case), Betty Strom, the Thirteenth Circuit Solicitor who is prosecuting the case, and Larry Brandt, one of Mrs. Hughes's attorneys, concerning this issue. Everyone is in agreement that you may talk to the attorneys for the prosecution, the attorneys for the defense, or you may choose not to talk to anybody at all. The point is, it is entirely your choice if you want to talk to either side and to whom you wish to talk. The only qualifications anybody would make is that if you talk to somebody about matters involved in the criminal charges, tell the truth, regardless of whether the truth hurts or helps either side.

This issue has been brought before County Council and County Council has unanimously agreed that no adverse employment decision will be made by the County for a person cooperating or refusing to cooperate with either the defense or the prosecution. This includes terminations, lateral moves and/or demotions. In other words, if you talk to a lawyer or an investigator about this case, it will have NO effect on your job, regardless of what you say. Council has also agreed that if the County does make an adverse employment decision against you as a result of your cooperation or lack of cooperation with either side of this case, the

County will be responsible for reasonable attorney's fees in the event you successfully litigate the adverse employment action.

If you have any questions about this letter, please do not hesitate to contact me.

Very truly yours,

FEDDER, NORTON, BALLENGER, & ENDERLIN, P.A.

Bradley A. Norton
Attorney at Law

BAN: ldw

May 20, 2003

On behalf of all five members of the Oconee County Council, I would like to make this brief statement.

This has been a difficult road for all of us. We want to assure the people of this county that we did not seek, nor did we expect to be dealing with anything other than the routine business of local government. In March, however, we were confronted by concerns from county employees over possible abuses of the Supervisor's office. In response to these concerns, we sought guidance from the Sheriff's office. Our inquiries led to the investigation and subsequent indictment.

Although this saddens everyone, and has resulted in a great deal of criticism directed towards the council, we simply did our duty as elected officials and guardians of the public trust. As painful as it has been for us and our families, we would do it again if presented with the same circumstances. After all, we were not elected to look the other way, rather to act in the best interest of the taxpayers of Oconee County.

We want everyone to know that we have the highest regard for the employees of this county. They are highly skilled public servants who are ready to get on with their jobs, providing services to the citizens. We are prepared to offer them every assistance in maintaining the high level of professionalism they have taught us to expect. Our plans are to enable and empower them to do what they do best. None of us feels the need for "hands-on" involvement in county business. The next few weeks and months will function smoothly under the direction of our highly competent department heads.

We covet your prayers as we navigate these troubled waters. Everything will be just fine. Soon, this dark chapter will be behind us and we can look forward to a great season of growth and prosperity here in God's country, Oconee County.

Sincerely,
The Oconee County Council